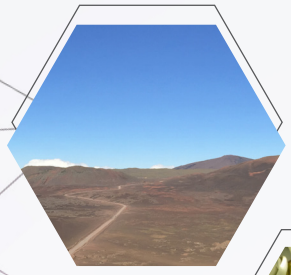
BOOK OF ABSTRACTS
TALKS

Island BIOLOGY



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Island Biology

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Unraveling the history of Apis mellifera in the islands of the South-West Indian Ocean: what we have learned from genetic, genomic, morphometric and ecological approaches

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Honeybees are present on all islands of the South Western Indian Ocean (SWIO), including Madagascar and three surrounding archipelagos (the Comoros, Seychelles and Mascarenes). If *Apis mellifera unicolor* is indubitably an African subspecies endemic to Madagascar, its relationship with insular honey bee populations from this hotspot of biodiversity is misunderstood and its ecological role in natural ecosystems still poorly documented. In such a context, the evolutionary history of the species in the SWIO is pertinent to explore. The aims were to (i) characterize the genetic origins and diversity of the insular populations (ii) test whether morphological and genetic divergences among populations correlate and (iii) investigate the ecological role through the study of biotic interactions with the native flora. In collaboration with regional partners, a dataset of more than 4 000 colonies sampled in Madagascar and the 9 surrounding islands were considered for genetic, morphometric and genomic analyses. Mitochondrial screening indicated that insular populations belong to one private African sub-group, but also revealed recent human importation of European subspecies in the Mascarene Islands (Mauritius, Rodrigues, La Réunion). Nuclear DNA analyses highlighted significant genetic differentiations among insular populations from this African sub-group, suggesting ancient colonization events. When confronted, the patterns of genetic and morphological diversification observed were highly congruent both at the inter- and intra-archipelago scales. In Reunion, whole genome sequencing of individuals (n=36) showed admixture between African and European lineages, with however a higher level of *A. mellifera unicolor* mitotype. Results provide insights into the long- term consequences of introducing exotic specimens on the nuclear genome and indirectly on the morphology of locally adapted populations. Ecological surveys conducted in natural forest ecosystems from Madagascar and La Reunion confirmed the generalist foraging behavior strategy of *A. m. unicolor* and revealed a significant preference for native floral species. All together, these results shed light on the original diversity of the honeybee in the SWIO and the need to preserve it.

Keywords: adaptation, Apis mellifera, honeybee, insects, Madagascar, molecular evolution, pollination

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